t = time (s)
x_i = initial position (m)
x_f = final position (m)
v_i = initial velocity
v_f = final velocity (m/s)
a = acceleration (m/s²)

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PHYSICS: ACCELERATION, SPEED, AND TIME

Equations: $a = \frac{v_f - v_i}{t}$ $v_f = at + v_i$ $v = \frac{x_f - x_i}{t}$ $t = \frac{v_f - v_i}{a}$

Problems: In order to receive credit for this assignment you MUST *show your work*. You may use a calculator but you must show all steps of the process in the space provided.

1. If a Creature Cat's Ferrari, with an initial speed of 10 m/s, accelerates at a rate of 50 m/s/s for 3 seconds, what will its final speed be?

$v_i = 10 m/s$
$a = 50 m/s^2$
$t = 3 s$
$v_f = ?$

$v_f = at + v_i$
$v_f = (50 m/s^2)(3s) + 10 m/s$
$= (150 m/s) + 10 m/s$

$v_f = 160 m/s$

2. Douglas Stefanski's spectacularly sleek hovercraft glides down a track of 36m. It takes 13 him seconds to cross the finish line. What is Super-Stavri's speed?

3. A car advertisement states that a certain car that Emily Miller loves can accelerate from rest to 70 ~~km/h~~ m/s in 7 seconds. Find the car's average acceleration.

4. A baby lizard startles Steven Wade. The sweet little lizard accelerates from 2 m/s to 10 m/s in 4 seconds. What is the lizard's average acceleration as he runs away from Steven?

5. Amber moves from her desk to the door in 17 seconds. Her speed changes from rest to .5 m/s. What is Amber's average acceleration?

6. A cyclist named Carly Daugherty accelerates from 0 m/s to 8 m/s in 3 seconds. What is her acceleration? Is this acceleration higher than that of Soul Train's car, which accelerates from 0 to 30 m/s in 8 seconds? How do you know?

7. Reid runs away from Joharri after an intense political debate. His initial ~~acceleration~~ velocity is 0 ~~km/h~~ m/s and his final ~~acceleration~~ velocity is 25 ~~km/hour~~ m/s in 10 seconds. What is Reid's average acceleration?

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8. Megan hits a softball into the stands. She rounds the bases and crosses home plate at 27~~km/h~~ m/s. Her journey takes 6 seconds. What is Megan's average acceleration?

9. Saagar gives a certain teacher some sass followed by an eye roll. Suddenly, a chankla is thrown at him. The flip-flop moves from rest to 12~~km/hr~~ m/s when it strikes Saagar in the back of the head. The flight of the chankla takes only 1.2 seconds. What is the average acceleration of the chankla?

10. Dominic Roth is in a roller coaster car, which rapidly picks up speed as it rolls down a slope. As it starts down the slope, its speed is 4 m/s. But 3 seconds later, at the bottom of the slope, his speed is 22 m/s. What is its average acceleration?

11. Chintu and Raven build a rocket, which moves from the earth to about 86m into the sky. It takes 3.7 seconds to reach the rocket's highest point. What is his speed of the rocket's ascent?

12. Lillian has had enough of Tiffany's antics and high jinks and walks over to Tiffany's table. With an initial speed of 2 m/s, Lillian accelerates at a rate of 18 m/s/s for 1.5 seconds, what is her final speed?

13. Mrs. Bontkowski watches Connor Ladone on the basketball court. Connor dribbles the ball from one end of the court to the other. With an initial speed of 0 m/s and final speed of 14 m/s, he accelerates at a rate of 2 m/s/s. How long does it take Connor to get from one end of the court to the other?

14. Jerusha and Anavi are working very hard to tend their organic veggie garden when Jerusha sees a bunny nibbling on a tender lettuce leaf. In a fit of rage, Anavi chases the fluffy little rabbit across the yard. The bunny darts from rest to 16~~km/hr~~ m/s in 3 seconds. What is the innocent little bunny's average acceleration?